Project location

The project site of about 160 acres is located on the north side of Central Road, East of the Des Plaines River. The project site is located in Section 31 Township 42 North Range 12 East (Northfield Township) of the 3rd Principal Meridian, in Cook County, Illinois.

J. Sexton

Project Geology

The project site is located in the Des Plaines River Valley and the surficial soils consist of Valley train soils deposited by the river water during the post glacial period. These soils are sands, Henry Formation Mackinaw member, covered by later clay sediments, generally less than 10 feet thick. Underlying the site is a sequence of clay tills of glacial origin which extend to bedrock about 100 feet below grade. Tills of the Park Ridge, Tinley, Valparaiso, and pre-Valparaiso glaciers are expected to overly the bedrock, the Silurian age Niagran Dolomite. The Dolomite bedrock is a dense, thinly bedded, jointed rock, the aquifer source of potable water of the area. The site is in the Des Plaines fault area and some non-conformity of bedrock might occur, however.

Soil Conditions

The analysis of the subsoils was made by review of a report of subsurface soil conditions prepared by Testing Service Corporation in 1963 , and by an on site inspection of a disposal trench. The following is a generalized summary of the soil stratigraphy of the site:

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Soil Type	Av. Thickness (ft)	W. Depth (ft)	Geological Origin
"Topsoil"	1	0.0-1.0	Recent
Silty Clay	7	1.0-8.0	Alluvial
Sand	2.5	8.0 to 10.5	Valley train
Silty Clay	16.5	10.5 to 27.0	Glacial, Park Ridge
Silty Clay	9	27.0 to 36.0	Glacial, Tinley
Silty Clay	30	36.0 to 66.0	Glacial, Valparaiso
Silt, sand, gravel	32	66.0 to 98.0	Glacial, pre-Valparaiso
"Bedrock"		98.0	Silurian Niagran Dolomite

Soil Characteristics

The uppermost soil deposit, the alluvial silty clay is weathered and desiccated and highly impervious. There is an intermittant bed of sand as a "marker" on top of the till, and this sand ranges from non-existant to 5.5 feet thick at the boring locations. It appears as water bearing and is classed as permeable. The underlying silty clay tills are classed as highly impermeable soils and two samples removed from a disposal trench were tested for permeability (see also report of test sheet enclosed). Per-

Soil Characteristics (Continued)

meability of these silty clays was of the magnitude of 10-8 centimeters per second. The uppermost silty clay layers appears to be the Park Ridge till, and is the least precompressed of the till layers. It is generally plastic. The underlying silty clays, and silts each precompressed and hand in consistency, appear as the Tinley and Valparaiso tills. The bottom of the highly impermeable silty clay and silt tills appear to range from 44 to 71 feet below grade at the boring locations. Between the bottom of the silty clay tills and the bedrock surface is a sequence of moderately permeable to permeable sand, and sand gravel formations, considered water bearing or basal aquifers.

Site Hydrology

The surface water run off appears to be towards the Des Plaines River. It is assumed that final grade plans will drain the surface water to the river or its tributaries.

Most borings reveal a thin water bearing sand stratum at shallow depth just above the clay tills. The direction of flow of this ground water is also expected to be similar to the surficial water, to the Des Plaines River.

The Basal aquifer appears to contain water, but the direction of flow is not definitely known. Because local drawdown by the existing water well on the site is likely to be taking place, it is probable that flow in this above bedrock aquifer is likely towards the existing well.

The bedrock ground water flow is likely toward the existing water well which is expected to be creating a local cone of depression. The general direction of ground water flow in the upper dolomite is eastward.

Conclusions and Recommendations

Suitability of Subsoils

The sequence of impermeable silty clay tills are expected to provide an impermeable barrier to flow of contaminents from the land fill to the underlying aquifers provided an adequate thickness of these impermeable tills is left in place below the base of the solid waste. The upper sand layer and also silt or sand lenses that might be exposed in excavating the trenches will require sealing. The previously recommended (TSC report) 4 feet minimum of impermeable silty clay is considered adequate to be left in place below the fill, or this same thickness should be placed and compacted

Conclusions and Recommendations (Continued)

Suitability of Subsoils (Continued)

to seal local silt or sand lenses that might be encountered.

Two samples of the "silty clay" tills were taken from an exposure for a trench in the southwest part of the site. These samples were tested for grain size analysis, permeability, and cation exchange capacity, and the results are included under a report of test elsewhere in this report. The following is a tabulation of the results of the tests.

Geological Classification	Soil Classification	Coefficient of Permeability	Ion Exchange Capacity
Tinley	Clay	2.3 & 10-8	7.7 mc/100
Valparaiso	Clay	4.7 & 10-8	7.2 mc/100

The results of these tests indicate the fills to be highly impermeable, with high ion exchange capacity, and therefore well suited for prevention of seepage of land fill leachates to underlying aquifers.

Monitoring Wells

The existing water well at the service facility is considered an adequate monitoring well for the bedrock and basal aquifers. Although no log of the well was available it is reported that this well is into the underlying bedrock.

A periodic monitoring program for this well is recommended, and it is known that such a program is underway for the existing service facility water well.